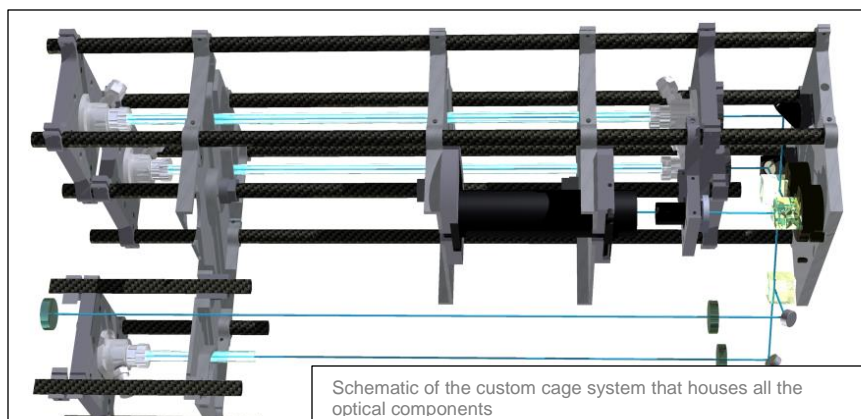


NOAA
Innovation

NO_y Cavity Ring-Down Spectrometer

Function:

Reactive nitrogen compounds play a central role in atmospheric chemistry. NOAA's Patent-Pending NO_y Cavity Ring-Down Spectrometer is a new method for detection of NO_y as part of a compact system that measures NO, NO₂, and Ozone (O₃) based on cavity ring-down spectroscopy (CRDS) to deliver an absolute measurement of trace gas concentration. This instrument converts NO_y and its components into NO₂ by thermal decomposition in a fused silica inlet, followed by the addition of O₃ to convert NO into NO₂. The combination of heat plus ozone is a new method to determine total NO_y.



Schematic of the custom cage system that houses all the optical components

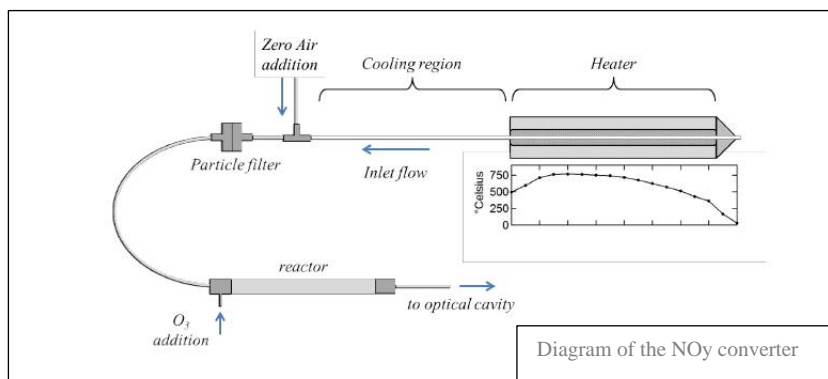


Diagram of the NO_y converter

Product Specifications:

- A laser diode centered at 405 nm and modulated with a 2 kHz square wave provides light for the 4 measurement channels.
- The optical system is mounted in a custom designed cage system the holds all four optical cavities and the laser rigidly and robustly using 1/2 inch carbon fiber rods, providing stability against mechanical and thermal stress.
- The 50 cm cavity length allows for instrument mounting in standard, 19" racks.
- Ring down time constant: 30 μs, with a precision of 6 ns.
- System dimensions: The current prototype is 110 cm high with a 50 by 70 cm footprint. Consumes 300 W of power at its peak. The prototype weighs 95 kg, which includes the sample pump, a zero air generator, and data acquisition system. Several aspects of the prototype, including flow control and data acquisition, can be miniaturized in the final engineered product to yield a similar footprint
- Prototype available and data from two quantitative field testing periods available for validation.

NOAA Technology Partnerships Office
Promoting Partnership & Commercialization of NOAA Innovations

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